

4. Show routes of existing, construction, and future flows at all discharge points and downstream hydraulic structures.
5. Use a minimum USGS 1:2400 topographic map as a base for the figure.
6. Show (and cite) the length of travel from the farthest upstream end of a proposed storm system in the development to any proposed flow control facility.

Figure 4. Soils

Show the soils within the following areas:

1. The *project site*
2. The area draining to the *site*
3. The drainage system downstream of the *site* for the distance of the downstream analysis (see Section 1.2.2).

Copies of King County Soil Survey **maps** may be used; however, if the maps do not accurately represent the soils for a proposed project (including offsite areas of concern), it is the design engineer's responsibility to ensure that the actual soil types are properly mapped. Soil classification symbols that conform to the *SCS Soil Survey for King County* shall be used; and the equivalent KCRTS soil type (till, outwash, or wetlands) shall be indicated (see Table 3.2.2.B).

Subdivision projects may need to evaluate the soils on each lot for applicability of the full infiltration flow control BMP as specified in Section 5.2. This soils report, as well as geotechnical investigations necessary for proposed infiltration facilities, should be referenced in the TIR Overview and submitted under Special Reports and Studies, TIR Section VI. A figure in the required geotechnical report that meets the above requirements may be referenced to satisfy 1, 2, and 3 above.

❑ TIR SECTION 2 CONDITIONS AND REQUIREMENTS SUMMARY

The intent of this section is to ensure all preliminary approval conditions and applicable requirements pertaining to *site* engineering issues have been addressed in the site improvement plan. All conditions and requirements for the proposed project should be included.

In addition to the core requirements of this manual, adopted basin plans and other plans as listed in Special Requirement #1 should be reviewed and applicable requirements noted. Critical area requirements, conditions of plat approval, and conditions associated with development requirements (e.g., conditional use permits, rezones, variances and adjustments, SEPA mitigations, etc.) should also be included.

❑ TIR SECTION 3 OFFSITE ANALYSIS

All projects in engineering review shall complete, at a minimum, an Offsite Analysis, except for projects meeting the exemptions outlined in Section 1.2.2. The Offsite Analysis is usually completed as part of the initial permit application and review process, and is to be included in the TIR. *Note: If offsite conditions have been altered since the initial submittal, a new offsite analysis may be required.*

The primary component of the offsite analysis is the **downstream analysis** described in detail below. Upstream areas are included in this component to the extent they are expected to be affected by backwater effects from the proposed project. Other components of the offsite analysis could include, but are not limited to, evaluation of impacts to fish habitat, groundwater levels, groundwater quality, or other environmental features expected to be significantly impacted by the proposed project due to its size or proximity to such features.

Levels of Analysis

The offsite analysis report requirements vary depending on the specific *site* and downstream conditions. Each project submittal shall include at least a Level 1 downstream analysis. Upon review of the Level 1 analysis, DDES may require a Level 2 or Level 3 analysis. If conditions warrant, additional, more detailed analysis may be required. *Note: Potential impacts upstream of the proposal shall also be evaluated.*

Level 1 Analysis

The Level 1 analysis is a qualitative survey of each downstream system leaving a *site*. This analysis is required for all proposed projects and shall be submitted with the initial permit application. Depending on the findings of the Level 1 analysis, a Level 2 or 3 analysis may need to be completed or additional information may be required. If further analysis is required, the applicant may schedule a meeting with DDES staff.

Level 2 or 3 Analysis

If problems are identified in the Level 1 analysis, a Level 2 (rough quantitative) analysis or a Level 3 (more precise quantitative) analysis may be required to further evaluate proposed mitigation for the problem. DDES staff will determine whether a Level 2 or 3 analysis is required based on the evidence of existing or potential problems identified in the Level 1 analysis and on the proposed design of onsite drainage facilities. The Level 3 analysis is required when results need to be as accurate as possible: for example, if the *site* is flat; if the system is affected by downstream controls; if minor changes in the drainage system could flood roads or buildings; or if the proposed project will contribute more than 15 percent of the total peak flow to the drainage problem location. The Level 2 or 3 analysis may not be required if DDES determines from the Level 1 analysis that adequate mitigation will be provided.

Additional Analysis

Additional, more detailed hydrologic analysis may be required if DDES determines that the downstream analysis has not been sufficient to accurately determine the impacts of a proposed project on an existing or potential drainage problem. This more detailed analysis may include a **point of compliance analysis** as detailed in Section 3.3.6.

Scope of Analysis

Regardless of the level of downstream analysis required, the applicant shall define and map the study area (Task 1), review resources (Task 2), inspect the study area (Task 3), describe the drainage system and problems (Task 4), and propose mitigation measures (Task 5) as described below.

Task 1. Study Area Definition and Maps

For the purposes of Task 2 below, the study area shall extend downstream one mile (minimum flowpath distance) from the proposed project discharge location and shall extend upstream as necessary to encompass the offsite drainage area tributary to the proposed *project site*. **For the purposes of Tasks 3, 4, and 5**, the study area shall extend downstream to a point on the drainage system where the proposed *project site* constitutes less than 15 percent of the total tributary drainage area, but not less than one-quarter mile (minimum flowpath distance). The study area shall also extend upstream of the *project site* a distance sufficient to preclude any back water effects from the proposed project.

The offsite analysis shall include (1) a **site map** showing property lines, and (2) the **best available topographical map** (e.g., from DDES, Department of Transportation map Counter, Sewer District, or at a minimum a USGS 1:24000 Quadrangle Topographic map) with the study area boundaries, *site* boundaries, downstream flowpath, and potential/existing problems (Task 4) shown. Other maps, diagrams, and photographs such as aerial photos may be helpful in describing the study area.

Task 2. Resource Review

To assist the design engineer in preparing an offsite analysis, King County has gathered information regarding existing and potential flooding and erosion problems. For all levels of analysis, all of the